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Engineer Research and Development Center

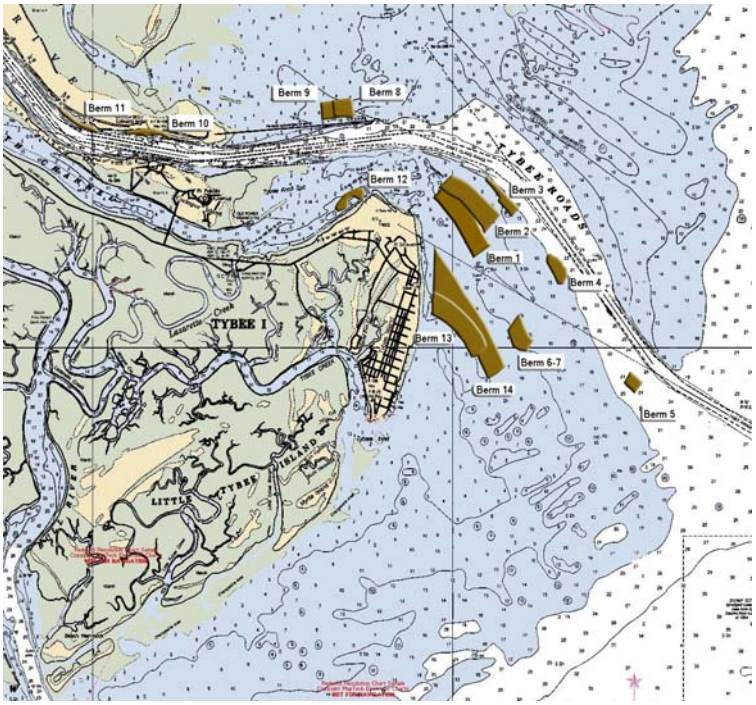
Savannah Harbor Entrance Channel: Nearshore Placement of Dredged Material Study

Description

CHL, in support of the U.S. Army Engineer District, Savannah (SAS), performed numerical modeling and field data analysis studies to identify and evaluate nearshore placement options of dredged material. These nearshore placement options maximize benefit to the littoral system and beaches along Tybee Island while conserving space in Offshore Dredged Material Placement Sites (ODMDS).

Issue

The Savannah River Entrance Channel (or Bar Channel) dredged through the river's ebb shoal is approximately 19 km long. Dredging is required annually to maintain the Bar Channel to the federally authorized channel depth of 44 feet. SAS has been investigating alternate, beneficial use placement locations for the estimated 500,000 yd^3 dredged annually.



Products

1. A modeling suite for determining optimal nearshore placement of dredged material near the Savannah River ebb shoal. The modeling suite includes fine-resolution calibrated and verified hydrodynamic, wave, and sediment transport models for the entire ebb shoal and surrounding region. 2. Guidance and recommendations for nearshore placement to feed sand to the littoral system and beach, while minimizing both re-handling (dredged material re-entering the channel) and adverse impact on adjacent shorelines.

Supporting Technology

The two-dimensional, depth-integrated ADCIRC hydrodynamic model predicted nearshore surface elevation and current distribution resulting from atmospheric conditions and tributary flow. The spectral wave transformation STWAVE model was applied with nested grids to predict wave conditions and wave-current interactions at a scale appropriate to define with and without project conditions. The GENESIS model simulated long-term shoreline evolution for with and without project conditions. The GTRAN model determined sediment pathways for dredged material placed in the nearshore. Sediment cores from the ebb shoal were analyzed with the SEDflume to determine the critical shear stress and erosion rate for the mixed sand/silt/clay dredged material for input into GTRAN. The SSFATE far field dredged material dispersion model estimated the dispersion of

dredged material plumes and forecast turbidity during the dredging and placement operations.

Benefits

Placement of sandy dredged material within the littoral zone would benefit adjacent beaches, reduce the need for beach nourishment, and conserve capacity in the ODMDS. Present offshore placement practices isolate the material from the regional sediment system. Nearshore placement supports USACE Regional Sediment Management (RSM) efforts by placing dredged material into pathways where it would naturally migrate in the absence of a navigation project. Conclusions of this study will assist SAS in managing dredged material, support beneficial uses, minimize ODMDS fill, and support (RSM) for the Savannah River/north Georgia coast.

Sponsor

U.S. Army Engineer District, Savannah.

Point of Contact

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